

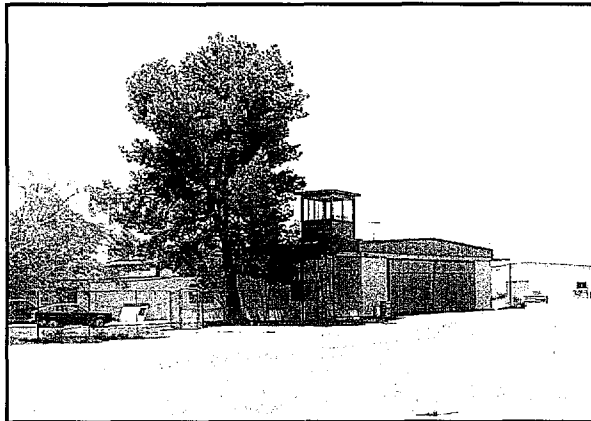


Chapter Two

AVIATION DEMAND FORECASTS



AVIATION DEMAND FORECASTS



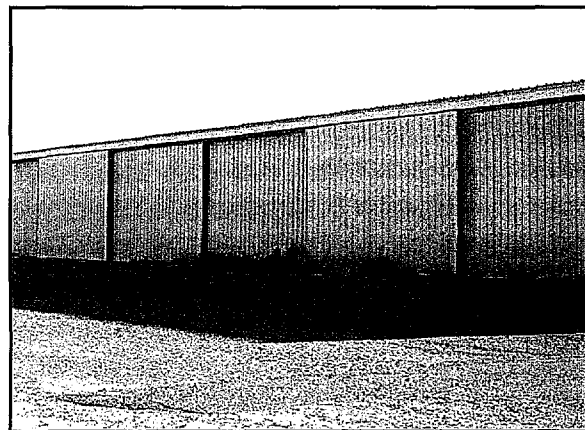
Facility planning must begin with a definition of the demand that may reasonably be expected to occur at the facility over a specific period of time. In airport master planning, this involves forecasts of aviation activity indicators over a twenty-year planning period. In this master plan, forecasts of based aircraft, based aircraft fleet mix, and annual aircraft operations will serve as the basis for facility planning.

It is virtually impossible to predict with certainty year-to-year fluctuations of activity when looking twenty years into the future. Because aviation activity can be affected by many influences at the local, regional, and national level, it is important to remember that forecasts are to serve only as guidelines and planning must remain flexible enough to respond to unforeseen facility needs.

The following forecast analysis examines recent developments, historical information, and current aviation trends to provide an updated set of based aircraft and operational projections. The intent is to permit the City of Eloy to make the planning adjustments necessary to ensure that the facility meets projected demands in an efficient and cost effective manner.

NATIONAL AVIATION TRENDS

Each year, the Federal Aviation Administration (FAA) publishes its national aviation forecast. Included in this publication are forecasts for air carriers, regional/commuters, general aviation, military, and FAA workloads. The forecasts are prepared to meet



budget and planning needs of the constituent units of the FAA and to provide information that can be used by state and local authorities, the aviation industry, and by the general public. The current edition when this chapter was prepared was *FAA Aviation Forecasts - Fiscal Years 1997-2008*. The forecast uses the economic performance of the United States as an indicator of future aviation industry growth. Similar economic analyses are applied to the outlook for aviation growth in international markets.

For the U.S. aviation industry, the outlook for the next twelve years is for moderate economic growth, declining real fuel prices, and modest inflation. Based on these assumptions, aviation activity by fiscal year 2008 is forecast to increase by 17.0 percent at combined FAA and contract towered airports and 24.6 percent at air route traffic control centers. The general aviation active fleet is projected to increase by almost 8.4 percent while general aviation hours flown are forecast to increase by 12.9 percent.

GENERAL AVIATION

The general aviation industry is an important contributor to the nation's economy. General aviation (GA) includes the production and sale of aircraft, avionics and other equipment, along with the provision of support services such as flight schools, fixed base operators, finance and insurance. Following more than a decade of decline, many statistical measures for general aviation have been generally positive over the past two years.

In 1996, general aviation completed its second year of operations following the passage of the General Aviation Revitalization Act of 1994 (federal legislation which limits the liability on general aviation aircraft to 18 years from the date of manufacture). This legislation sparked an interest to renew the manufacturing of general aviation aircraft due to the reduction in product liability and a renewed optimism for the industry. The high cost of product liability insurance was a major factor in the decisions by many American aircraft manufacturers to slow or discontinue the production of general aviation aircraft.

In 1996, general aviation aircraft shipments were up 9.4 percent following a 12.9 percent increase in 1995. Piston-engine aircraft shipments were up 4.3 percent and turboprop shipments were up 21.8 percent. Billings for general aviation aircraft were down; however, this decline reflects the change in the mix of aircraft shipments which includes increasing numbers of lower-priced piston powered aircraft. The amateur-built aircraft market continues to show steady growth, just as it has over the past 25 years.

Despite a small decline in the number of active pilots, student pilot starts were up 5.0 percent, the first increase since 1990. These student pilots are the future of general aviation and are one of the key factors impacting the future direction of the general aviation industry. This increase combined with the increases in piston-powered aircraft shipments and aircraft production are a signal that many of the industry initiated programs to revitalize general aviation maybe taking hold.

The most notable trend in general aviation is the continued strong use of general aviation aircraft for business and corporate uses. In 1995 (the latest year of recorded data), the number of hours flown by the combined use categories of business and corporate flying represented 24.7 percent of total general aviation activity increasing from 23.3 percent of total general aviation activity in 1994. In 1990, the number of hours flown by the combined use categories of business and corporate flying represented 21.8 percent of total general aviation activity.

Exhibit 2A depicts the FAA forecast for active general aviation aircraft in the United States. The FAA forecasts general aviation active aircraft to increase at an average annual rate of 0.8 percent over the next 12 years, increasing from 181,341 in 1996 to 196,600 in 2008. Over the forecast period, the active fleet is expected to increase by almost 1,300 annually considering approximately 2,000 annual retirements of older piston aircraft and new aircraft production at 3,000 to 4,000 annually. Turbine-powered aircraft are projected to grow faster than all other segments of the national fleet and grow 1.3 percent annually through the year 2008. This includes the number of turboprop aircraft growing from 4,530 in 1996 to 5,200 in 2008 and the number of turbojet aircraft increasing from 4,577 in 1996 to 5,400 in 2008. Amateur built aircraft are projected to increase at an average annual rate of 1.0 percent over the next twelve years, increasing from 16,382 in 1996 to 18,400 in 2008.

AIRPORT SERVICE AREA

The initial step in determining aviation demand for an airport is to define its generalized service area for the various segments of aviation the airport can accommodate. The airport service area is determined primarily by evaluating the location of competing airports, their capabilities and services, and their relative attraction and convenience. With this information, a determination can be made as to how much aviation demand would likely be accommodated by a specific airport.

In determining the aviation demand for an airport it is necessary to identify the role of the airport. The primary role of Eloy Municipal Airport is to serve the needs of general aviation. General aviation is a term used to describe a diverse range of aviation activities which includes all segments of the aviation industry except commercial air carriers and military. General aviation is the largest component of the national aviation system and includes activities ranging from pilot training, to recreational flying, to the use of sophisticated turboprop and turbojet aircraft for business and corporate uses.

For Eloy Municipal Airport, the principal service area is limited by the other public use airports in central Pinal County providing competing levels of service to general aviation. These public-use airports were previously described in Chapter One and include Casa Grande Municipal Airport, Coolidge Municipal

Airport, Pinal Airpark, and Avra Valley Airport. Eloy Municipal Airport's draw from Pinal County communities to the north is limited by Casa Grande Municipal Airport. Coolidge Municipal Airport limits the airport's service area to the northeast, while Pinal Airpark and Avra Valley Airport limit the airport's service area to the south.

Local economic and population growth in the City of Eloy and surrounding communities will tend to increase user demand at Eloy Municipal Airport as aircraft owners generally elect to base their aircraft close to their residences. The forecast analyses conducted in the following sections will take into consideration the expected local and regional growth and the nearby airports which share a portion of the Eloy Municipal Airport service area.

POPULATION PROJECTIONS

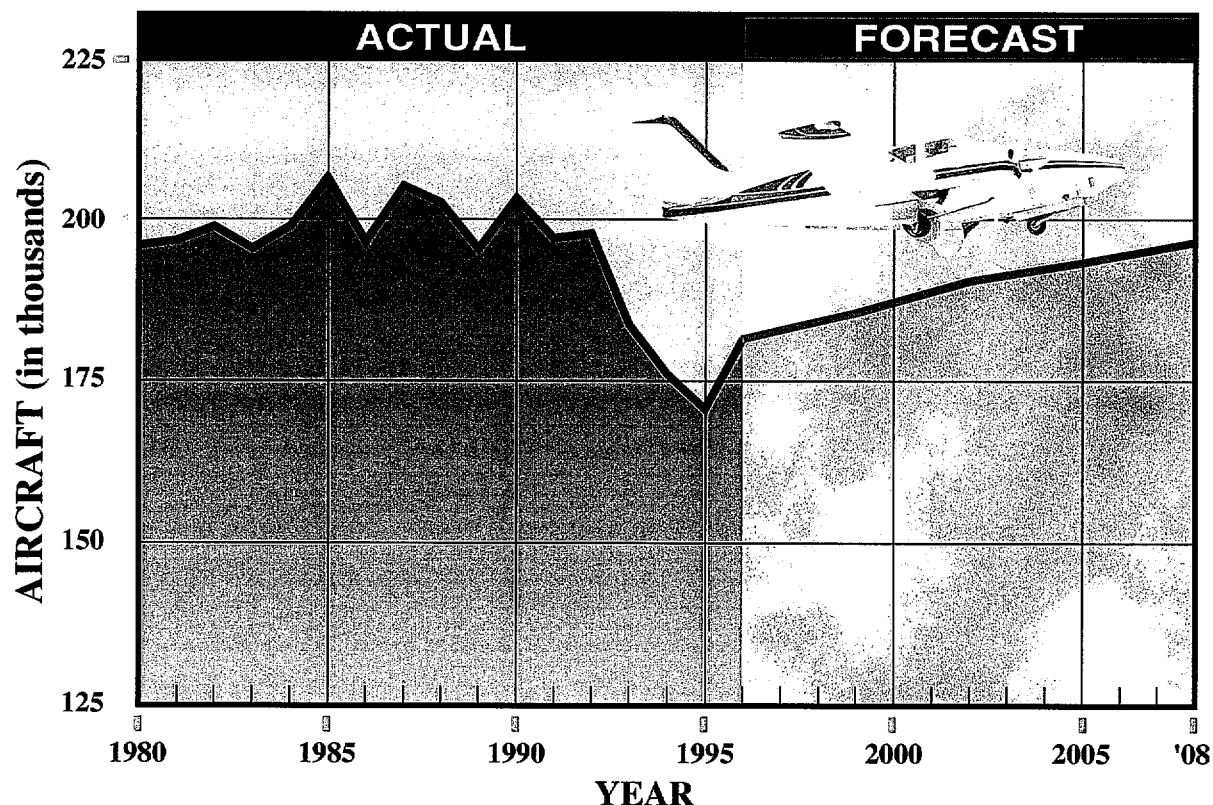
Population growth provides an indication of the potential for sustaining growth in aviation activity over the planning period. Historical and forecast population for the City of Eloy is summarized in **Table 2A**. Since 1980, Eloy's population has increased by nearly 2,700 and averaged an annual growth rate of 2.4 percent. Eloy's population is projected to grow at an average annual rate of 1.04 percent through the year 2020 when the population is expected to reach 11,562.

TABLE 2A Historical and Forecast Population	
Year	City of Eloy
Historical	
1980	6,240
1990	7,211
1995	8,915
Forecast	
2000	9,550
2005	10,124
2010	10,651
2015	11,128
2020	11,562
Source: Arizona Department of Economic Security	

GENERAL AVIATION FORECASTS

To determine the types and sizes of facilities that should be planned to accommodate general aviation activity, certain elements of this activity must be forecast. Indicators of general aviation demand include: based aircraft, the based aircraft fleet mix, annual operations, and peak activity. The remainder of this chapter will examine historical trends with regard to these areas of general aviation and project future demand for these segments of general aviation activity at the airport.

ACTIVE GENERAL AVIATION AIRCRAFT



U.S. ACTIVE GENERAL AVIATION AIRCRAFT (in thousands)

As of January 1	FIXED WING				ROTORCRAFT				
	PISTON		TURBINE		ROTORCRAFT		Experimental	Other	Total
	Single Engine	Multi- Engine	Turboprop	Turbojet	Piston	Turbine			
1996	128.8	16.6	4.5	4.6	1.5	3.6	16.4	5.3	181.3
1999	132.0	16.8	4.6	4.8	1.4	3.6	17.0	5.4	185.6
2002	135.4	17.0	4.8	5.0	1.4	3.6	17.5	5.6	190.3
2005	137.4	17.2	5.0	5.2	1.3	3.6	18.0	5.7	193.4
2008	139.5	17.4	5.2	5.4	1.2	3.6	18.4	5.9	196.6

Source: FAA Aviation Forecasts, Fiscal Years 1997-2008.

Notes: Detail may not add to total because of independent rounding. An active aircraft must have a current registration and it must have been flown at least one hour during the previous calendar year.



BASED AIRCRAFT

The number of based aircraft is the most basic indicator of general aviation demand at an airport. By first developing a forecast of based aircraft, the growth of aviation activities at the airport can be projected. The preparation of based aircraft forecasts for Eloy Municipal Airport was initiated with a review of historical data regarding based aircraft at the airport. Historical based aircraft records are maintained by the State and FAA. Based aircraft totals for the State are derived from aircraft registrations, while based aircraft totals for the FAA are derived from an annual inspection of the airport. In 1996, there were 22 aircraft registered with the State as based at Eloy Municipal Airport. FAA records for the same year indicate 39 based aircraft. This discrepancy in based aircraft totals is associated with the number of aircraft which utilize Eloy Municipal Airport on a regular basis, but are located off of airport property. Ag-Aero, Al-Don Disting, and Sky Dive Arizona each operate aircraft at the airport from facilities located off of airport property. Based on existing hangar space (which includes 12 T-hangar facilities and 5 conventional hangars) and aircraft tiedown trends as observed by Aero Specialist (which includes 5-7 aircraft regularly tied down), the based aircraft totals as reported by ADOT closely approximate the number of aircraft utilizing on-airport facilities. For purposes of determining future on-airport facility needs and deriving on-airport based aircraft trends, this master plan will utilize historical based aircraft totals provided by the State as these more closely approximate actual historical based aircraft utilizing on-airport facilities.

Table 2B summarizes historical based aircraft at Eloy Municipal Airport and historical registered aircraft in Pinal County. As evidenced in the table, based aircraft totals have fluctuated since 1988, when based aircraft were at a nine-year high of 27. Based aircraft totals have since declined slightly from the 1988 level and were at 22 in 1996. Pinal County registered aircraft declined between 1988 and 1994, increasing in 1995 and 1996, reaching a nine-year high of 251 in 1996. The percent of registered aircraft based at Eloy Municipal Airport declined over the same period as based aircraft totals remained static and Pinal County registered aircraft increased.

Future based aircraft demand at Eloy Municipal Airport has been analyzed by examining the airport's share of regional and national aviation markets. First, the airport's share of Pinal County registered aircraft has been examined. As shown in **Table 2B**, the percent of registered aircraft based at Eloy Municipal Airport has declined since 1988, mostly as a result of an increase in Pinal County registered aircraft and static based aircraft totals at Eloy Municipal Airport. The 1995 SANS projected Pinal County registered aircraft to grow to 364 by the year 2015, which would equate to a 1.9 percent annual growth rate from the 1996 figure of 251. Assuming that the airport's share of Pinal County registered aircraft remained static, or at the 1996 level of 8.7 percent, would yield 35 based aircraft by the end of the planning period. Based upon forecast local and regional population and economic growth, it is likely that the airport's share of Pinal County registered aircraft will increase through the planning period. An increasing market share of Pinal County registered aircraft yields 46 based aircraft by the end of the planning period.

TABLE 2B Historical and Forecast Based Aircraft and Pinal County Registered Aircraft			
Year	Pinal County Registered Aircraft ¹	Eloy Municipal Airport Based Aircraft ²	Percent of Pinal County Registered Aircraft Based At Eloy
HISTORICAL			
1988	228	27	11.8
1994	209	21	10.0
1995	231	25	10.8
1996	251	22	8.7
FORECASTS			
Constant Market Share			
2000	297	26	8.7
2005	321	28	8.7
2010 ³	342	30	8.7
2015	364	32	8.7
2020 ³	401	35	8.7
Increasing Market Share			
2000	297	27	9.0
2005	321	30	9.5
2010 ³	342	34	10.0
2015	364	38	10.5
2020 ³	401	46	11.5
¹ U.S. Census of Civil Aircraft (1988); ADOT (1994-1996) ² Eloy Municipal Airport Master Plan (1988); ADOT (1994-1996) ³ Extrapolated by Coffman Associates Source for Registered Aircraft Projections - 1995 SANS			

A market share analysis of national aircraft totals has also been conducted and is summarized in **Table 2C**. As indicated by the table, Eloy Municipal Airport's based aircraft market share for both U.S. and Western Pacific Region active aircraft increased between 1988 and 1995, decreasing slightly in 1996. Two market share forecasts are presented in **Table 2C**. First, a constant, or static market share of based aircraft was applied to U.S. and Western Pacific Region active aircraft forecasts.

Maintaining a constant market share of U.S. active aircraft, Eloy Municipal Airport can expect 32 based aircraft by 2020. A constant share of Western Pacific aircraft would yield 35 aircraft by 2020. Based upon the growth potential of the local and regional area, it is likely that the market share of aircraft based at the airport will increase. According to the table, an increasing market share of U.S. active and Western Pacific aircraft yields 51 and 43 based aircraft respectively.

TABLE 2C**Regional and National Active Aircraft Market Share Analyses**

Year	Eloy Municipal Airport Based Aircraft	U. S. Active Aircraft	% of U. S. Active	FAA Western-Pacific Region Aircraft	% of Western-Pacific Region Aircraft	
1988	27	202,700	0.013	35,300	0.076	
1994	21	176,000	0.012	29,600	0.071	
1995	25	170,600	0.015	28,200	0.089	
1996	22	181,200	0.012	29,500	0.075	

FORECASTS						
Year	Based Aircraft	U.S. Active Aircraft	%	Western-Pacific Region Aircraft	%	Based Aircraft
Constant Share						
2000	28	187,600	0.015	31,800	0.089	28
2005	29	193,400	0.015	33,400	0.089	30
2010	30	200,000	0.015	35,300	0.089	31
2015	31	206,600	0.015	37,200	0.089	33
2020	32	213,100	0.015	39,100	0.089	35
Increasing Share						
2000	30	187,600	0.016	31,800	0.092	29
2005	33	193,400	0.017	33,400	0.094	31
2010	38	200,000	0.019	35,300	0.097	34
2015	43	206,600	0.021	37,200	0.099	37
2020	51	213,100	0.024	39,100	0.110	43

Source for Historical and Forecast U.S. Active and Western Pacific Active Aircraft - <i>FAA Aviation Forecasts - Fiscal Years 1997-2008</i>						
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The 1996 *FAA Terminal Area Forecasts (TAF)* and 1995 *SANS* provide comparative forecasts. The 1996 *FAA TAF* uses 1995 base year data and forecasts no growth for based aircraft. The 1995 *SANS* used 1995 base year data and projected based aircraft increasing to 52 by the year 2015.

Presented in **Table 2D**, and on **Exhibit 2B** is a summary of all forecasts for based aircraft at Eloy Municipal Airport and the

selected planning forecast. The planning forecast is a median range projection which reflects the airport capturing a larger portion of regional and national aviation markets over the planning period. Continued local and regional economic and population growth supports the long-range potential for based aircraft growth at the airport. The planning forecast projects based aircraft at Eloy Municipal Airport growing at an average annual rate of 3.3 percent.

TABLE 2D**Based Aircraft Forecast Summary**

	2000	2005	2010	2015	2020
Constant Market Share of:					
U.S. Active General Aviation Aircraft	28	29	30	31	32
FAA Western-Pacific Region Aircraft	28	30	31	33	35
Pinal County Registered Based Aircraft	26	28	30	32	35
Increasing Market Share of:					
U.S. Active General Aviation Aircraft	30	33	38	43	51
FAA Western-Pacific Region Aircraft	29	31	34	37	43
Pinal County Registered Based Aircraft	27	30	34	38	46
Planning Forecast	26	31	36	42	48

In all likelihood, actual activity will not follow any one of the projections exactly. It is more likely that based aircraft levels will fluctuate within the range of the projections depicted on **Exhibit 2B**. Thus, these lines serve more as a planning envelope. The planning envelope reflects a reasonable range for based aircraft at the airport. With this in mind, the time-based projections of anticipated growth should serve only as a guide. At any given time over the planning period, the actual level of based aircraft could fall within the envelope area defined by low range (Constant Market Share of Pinal County Registered Aircraft) or the high range (Increasing Market Share of U.S. Active Aircraft).

FLEET MIX

Knowing the aircraft fleet mix expected to utilize the airport is necessary to

properly plan the facilities that will best serve not only the level of activity but also the type of activities occurring at the airport. The 1996 total of 22 based aircraft was comprised entirely of single engine aircraft.

The forecast mix of based aircraft was determined by examining existing and forecast U.S. general aviation fleet trends. The *FAA Aviation Forecasts Fiscal Years 1997-2008* was consulted for the U.S. general aviation fleet mix trends and considered in the fleet mix projections. The fleet composition of based aircraft at Eloy Municipal Airport is expected to remain heavily in single-engine piston aircraft, although there is expected to be an increasing percentage of multi-engine, turboprop, jet, and helicopters in the future mix, consistent with national trends. **Table 2E** summarizes the based aircraft fleet mix projections for the airport.

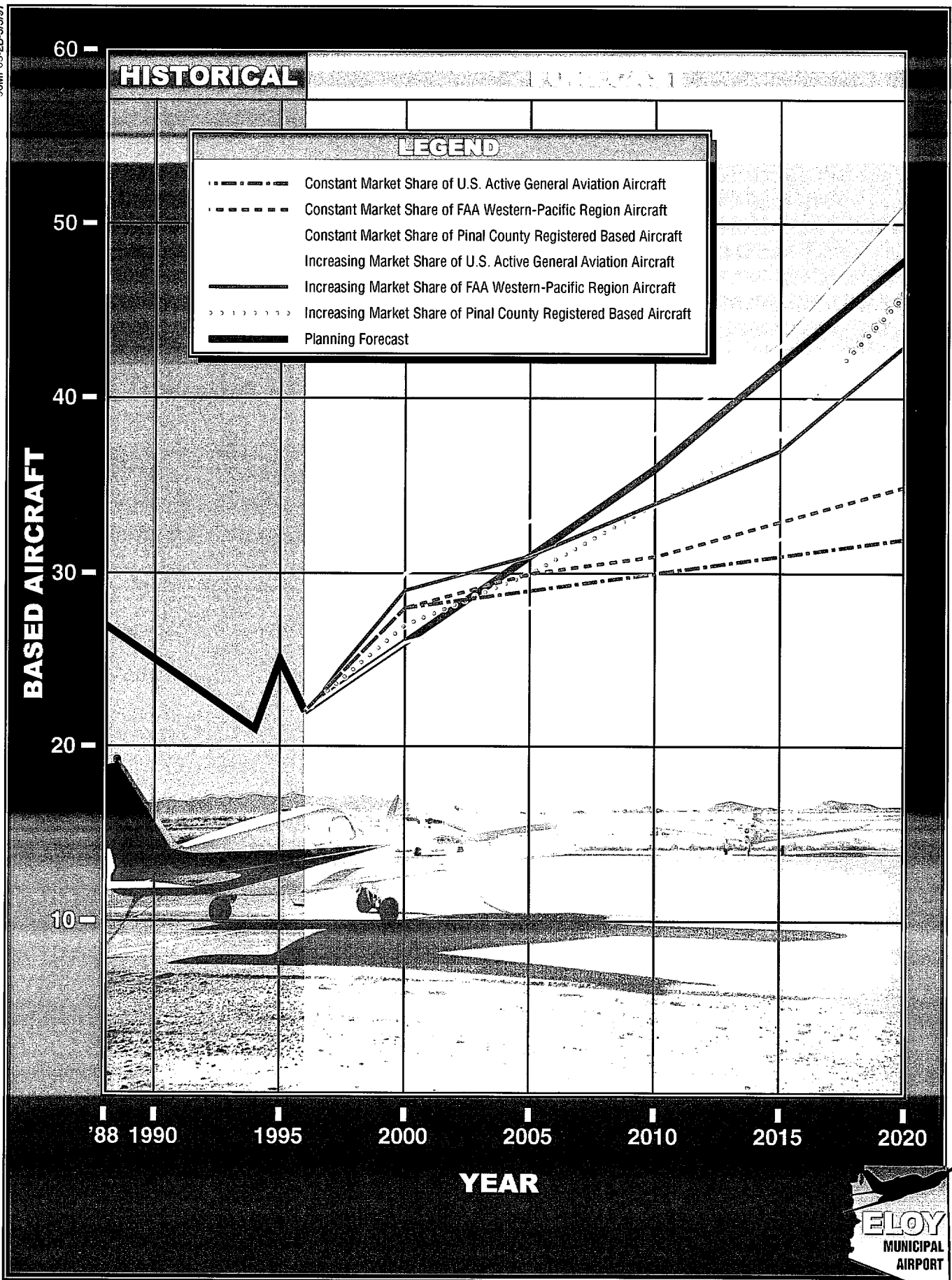


Exhibit 2B
BASED AIRCRAFT FORECASTS

TABLE 2E
Projected Based Aircraft Fleet Mix

Year	Total Based Aircraft	Single Engine	Multi Engine	Turbo Prop	Jet	Helicopter
<i>Historical</i>						
1996	22	22	0	0	0	0
<i>Forecast</i>						
2000	26	25	1	0	0	0
2005	31	27	2	1	0	1
2010	36	30	3	2	0	1
2015	42	33	4	3	0	2
2020	48	36	5	4	1	2

ANNUAL OPERATIONS

There are two types of general aviation operations at an airport: local and itinerant. A local operation is a take-off or landing performed by an aircraft that operates within site of the airport, or which executes simulated approaches or touch-and-go operations at the airport. Itinerant operations are those performed by aircraft with a specific origin or destination away from the airport. Generally, local operations are characterized by training operations. Typically, itinerant operations increase with business and industry use since business aircraft are used primarily to carry people from one location to another.

Due to the absence of an air traffic control tower at the airport, aircraft operations have not been regularly counted. Instead, only general estimates of historical and current activity is available. **Table 2F** summarizes historical operational estimates for the airport. The largest users of the airport are Skydive Arizona, Ag-Aero, and Al-Don Dusting, all located off of airport property. Based upon annual operational estimates

provided by these operators and including a factor for based aircraft and itinerant operations, total operations in 1996 have been estimated at 52,000. Sky Dive Arizona, Ag-Aero, and Al-Don Dusting each indicated that their 1996 operations did not vary significantly over previous years. Therefore, historical operations estimates may have understated annual operations at the airport.

Similar to based aircraft, regression and trend line analyses did not provide reasonable correlations for use in developing reliable operations forecasts. Therefore, projections of annual operations at Eloy Municipal Airport have been prepared by examining the number of operations per based aircraft.

For forecasting purposes, two forecasts of operations per based aircraft have been developed. First, a constant, or static level of 2,372 operations per based aircraft was applied to forecast based aircraft. This results in an operational level of 113,900 in 2020. As previously mentioned, aircraft locating off of airport property are the largest users of the airport. Continuing growth by these

users has the potential of contributing to additional airfield activity. An increasing operation per based aircraft forecast has

been developed to account for this additional activity. This results in an operational level of 124,800 in 2020.

TABLE 2F
Historical Operations Estimates

Year	Based Aircraft	Annual Operations	Operations Per Based Aircraft
1988	27	16,900 ¹	625
1995	25	24,623 ²	984
1996	22	52,000 ³	2,372

¹ *Eloy Municipal Airport Master Plan Update*, Turner, Collier & Braden Inc., November, 1988

² 1995 SANS

³ Coffman Associates

The 1995 SANS projected annual operations growing to 31,229 by the year 2015 for Eloy Municipal Airport. This forecast, however, was developed from a 1995 estimate of 24,623 operations for Eloy Municipal Airport, which, as mentioned, could be substantially less than the actual number of operations.

Exhibit 2C presents the planning forecast and “forecast envelope”. The additional activity resulting from aircraft located off of airport property will continue to drive the number of annual operations at Eloy Municipal Airport and likely contribute to an increase in the number of annual operations at the airport. The planning forecast accounts for this additional activity as well as additional activity resulting from increased numbers of based aircraft and increased itinerant use of the airport. The planning forecast projects annual operations at Eloy Municipal Airport growing at an average annual rate of 3.5 percent.

Local operations are estimated to account for a larger portion of total annual operations than itinerant operations. Traditionally, local operations reflect training operations. However, at Eloy Municipal Airport, the majority of local operations are attributable to the large number of operations conducted by Skydive Arizona and the aerial applicators located off of airport property. Operations by these users of the airport can be considered “local” since these aircraft operate in surrounding areas, close to the airport. By the very nature of their service, this requires them to use the airport exclusively without landing at a separate destination airport. Currently, local operations are estimated to account for approximately 80 percent of total annual operations. Itinerant operations are forecast to increase through the planning period (in number and as a percentage of total annual operations) due to the expected increased utilization of

business and corporate aircraft at the airport (which are typically itinerant operations). The projection of local and

itinerant operations are summarized in the table at the end of this chapter.

TABLE 2F
Annual Operations Forecast Summary

	2000	2005	2010	2015	2020
Constant Percentage of Operations per Based Aircraft	61,700	73,500	85,400	99,600	113,900
Increasing Percentage of Operations per Based Aircraft	62,400	76,000	90,000	107,100	124,800
<i>Planning Forecast</i>	62,000	74,000	88,000	103,000	119,000

PEAKING CHARACTERISTICS

Many airport facility needs are related to the levels of activity during peak periods. The periods used in developing facility requirements for this study are as follows:

- **Peak Month** - The calendar month when peak aircraft operations occur.
- **Design Day** - The average day in the peak month. Normally this indicator is easily derived by dividing the peak month operations by the number of days in a month.
- **Busy Day** - The busy day of a typical week in the peak month. This descriptor is used primarily to determine apron space requirements.
- **Design Hour** - The peak hour within the design day. This descriptor is

used primarily in airfield demand/capacity analyses, and in determining terminal building and access road requirements.

Adequate operational information for Eloy Municipal Airport is not available to directly determine peak aviation activity at the facility; therefore, peak period forecasts have been determined according to trends experienced at similar airports across the county. Typically, the peak month for activity at general aviation airports approximates 10-12 percent of the airport's annual operations. Peak month operations at Eloy Municipal Airport have been estimated as 10 percent of annual operations. The forecast of busy day operations at the airport was calculated as 1.25 times design day activity. Design hour operations were calculated as 13.0 percent of design day operations. Table 2G summarizes peak activity forecasts for Eloy Municipal Airport.

TABLE 2G
Peak Period Forecasts

	1996	2000	2005	2010	2015	2020
Annual Operations	52,000	62,000	74,000	88,000	103,000	119,000
Peak Month	5,200	6,200	7,400	8,800	10,300	11,900
Design Day	173	207	246	293	343	397
Busy Day	217	258	308	367	428	496
Design Hour	23	27	32	38	45	52

FORECAST SUMMARY

This chapter has outlined the various aviation demand levels anticipated over the planning period. The next step in the master plan is to assess the capacity of existing facilities to accommodate

forecast demand and determine which facilities will need to be improved to meet these demands. This will be examined in the next chapter, Chapter 3, Facility Needs Evaluation. **Table 2H** presents a summary of the aviation forecasts developed for the airport.

TABLE 2H
Aviation Forecast Summary

	1996	2000	2005	2010	2015	2020
Annual Operations						
Itinerant Operations	10,400	13,600	17,000	22,000	27,800	35,700
Local Operations	<u>41,800</u>	<u>48,400</u>	<u>57,000</u>	<u>66,000</u>	<u>75,200</u>	<u>83,300</u>
Total Annual Operations	52,000	62,000	74,000	88,000	103,000	119,000
Based Aircraft	22	26	31	36	42	48

